Southwest Fisheries Science Center
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Title of Accomplishment: Measure krill abundance and current vectors with a remotely monitored multi-instrumented buoy system.

Current Status: Initial experiments underway; to be completed in mid-March 2002.

Background Information: For over a decade, the Antarctic Treaty's Committee for the Conservation of Antarctic Marine Living Resources has been pioneering the ecosystem approach to fisheries management. The United States supports this international effort through the Antarctic Marine Living Resources Program (AMLR), managed at SWFSC, which aims to describe the functional relationships between Antarctic krill (*Euphausia superba*), their predators, and key environmental factors. AMLR's annual field studies include shipboard surveys of the meteorology, oceanography, phytoplankton, zooplankton and nekton around the South Shetland archipelago and a predator-monitoring base at Cape Shirreff, Livingston Island, Antarctica. The responses of land-based predators to changes in the availability of their food source are investigated. One challenge of this investigation is to temporally and spatially match the observations of predators and their prey.

Purpose of Activity: Multi-instrumented, remotely-monitored, oceanographic buoys were developed to provide long time-series measurements of relative krill abundance in the near-shore area of Cape Shirreff. The Advanced Survey Technologies Program contracted Derek Needham and associates of Sea Technology Services to fabricate the light-weight, low-cost, spar buoys. One of the prototype buoys is fitted with a 300 kHz acoustic Doppler current profiler to measure current vectors, acoustical volume backscatter, water temperature, pitch, roll, and bearing. Additionally, the buoy includes a data logging computer, GPS, radar reflector, strobe, radio-modem, and power management circuit. Remote control of the instrumentation and real-time monitoring of data is accomplished by radio-telemetry between the buoy a land-station. A second buoy was fitted with 38 and 200 kHz scientific echosounder.

Description of Accomplishment and Significant Results: Two buoys were deployed in succession, approximately 5 n.mi. east of Cape Shirreff near the head of a submarine canyon. The mooring location was chosen for its consistent association with krill aggregations and predator foraging activity. Preliminary results have identified a shoreward current in the canyon causing upwelling of deep water into the neritic zone. Also identified is a strong diel variation of krill abundance in the area.

Significance of Accomplishment: A relatively safe and cost-effective method has been developed for routine remote monitoring of prey available to seals and penguins based at Cape Shirreff. The first deployments have garnered new information about the temporal variation in krill dispersion and possible environmental forcing.

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